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ABSTRACT

This document summarizes the dispersal of funds on Arctic research by the National Science Foundation during fiscal years 1987 and 1988. Major areas considered were: atmospheric sciences; oceanography; biological sciences; earth sciences; science and engineering education; small business research; engineering and permafrost; Arctic information and advisory services; and Arctic research commission. General funding for each area is provided for the two fiscal years with a list of each individual project in each area. Included is the name of the senior investigator and institution, the project title, the funding provided, and the award number. (MVL)

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NATIONAL SCIENCE FOUNDATION

ARCTIC SCIENCE, ENGINEERING AND EDUCATION
Awards: Fiscal Years 1987 and 1988

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NATIONAL SCIENCE FOUNDATION

ARCTIC SCIENCE, ENGINEERING AND EDUCATION
Awards: Fiscal Years 1987 and 1988

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December 1988

ARCTIC SCIENCE, ENGINEERING, AND EDUCATION

The following is a list of arctic grants awarded by the National Science Foundation during Fiscal Years 1987 and 1988 (October 1, 1986, to September 30, 1988).

Presentation of this information is partially a response to the Arctic Research and Policy Act of 1984. The Arctic is defined by the Act as "all United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering and Chukchi Seas; and the Aleutian chain."

The Act designates the NSF as lead agency and chair-agency for an Interagency Arctic Research Policy Committee, and calls for integrated interagency planning and budgetary processes. Details are contained in several reports listed as References.

This detailed listing shows the scope of NSF activities in the Arctic. Essentially all of the NSF funds were devoted to basic science and engineering and related operational support. Further information on other agencies' programs is presented in a new information journal, Arctic Research of the United States, and the U.S. Arctic Research Plan and its biennial revision.

In addition to investigations in Alaska and adjacent waters, research was supported in essentially all Arctic-bordered countries. Of the total $23.1 million expended in Fiscal Year 1988, the Division of Polar Programs input is $8.2 million. The remainder is awarded from funds in other divisions and programs throughout the Foundation but mainly from other Divisions in the Directorate for Geosciences. These other offices have no "arctic program" but sponsor meritorious projects for the Arctic as part of their overall funding. Two new categories were added to the FY 1987 list: Small Business Innovation Research and Science and Engineering Education. The NSF funding of arctic research since 1982 is shown below (in thousands of dollars):

	FY82	FY83	FY84	FY85	FY86	FY87	FY88
DPP	5,887	6,209	7,344	7,947	8,005	8,095	8,211
Other	8,650	6,732	9,191	11,482	10,143	13,801	14,906
Total	14,537	12,941	16,535	19,429	18,148	21,896	23,117

The awards listed in this report conform to the definition of the Act as stated above. In some instances, awards are listed that may not fall strictly within the limits of the geographic definition but apply to processes, properties and phenomena of the Arctic. Examples include research on boreal forests, subarctic or temperate zone glaciers, geological and atmospheric projects south of the Arctic Circle, and laboratory and theoretical studies. Individual awards contain their own logistics budgets and no attempt is made to separate those costs; only specific awards for field support are listed separately (Sondrestrom radar, Greenland drilling and logistics.) The increase from FY87 to FY88 reflects increased ship support for arctic oceanography projects. A complete list of institutions and organizations that received funds in Fiscal Years 1987 and 1988 follows.

Users of this list should keep in mind that these projects do not exhaust the range of subjects that might be supported by the Foundation in the future. Any research which promises to add significantly to scientific and engineering knowledge is eligible for consideration. Additional information on NSF programs is contained in several NSF documents listed as References. The data reported in this grant list were compiled from individual program submissions from throughout the National Science Foundation. The information may differ from that in official National Science Foundation source documents.

REFERENCES

National Research Council. National Issues and Research Priorities in the Arctic. National Academy Press, Washington, D.C., 124 pp., July 1985. (Available in limited quantity from the Polar Research Board, National Research Council, 2101 Constitution Ave., N.W., Washington, D.C. 20418.)

Arctic Science and Engineering Opportunities. (Available: Polar Information, National Science Foundation, Washington, D.C. 20550.)

National Science Foundation. Guide to Programs (NSF 88-65). (Available: Forms and Publications, National Science Foundation, Washington, D.C. 20550.)

The Role of the National Science Foundation in Polar Regions (NSB 87-128). (Available: National Science Board, Washington, D.C. 20550.)

U.S. Arctic Research Commission. Entering the Age of the Arctic: Opportunities and Obligations of An Arctic Nation (January 31, 1988). (Available: Arctic Research Commission, Interstate Commerce Commission Building, Suite 6333, 12th Street & Constitution Ave., N.W., Washington, D.C. 20423.

U.S. Arctic Research Plan. Interagency Arctic Research Policy Committee (July 1987). (Available: Polar Information, National Science Foundation, Washington, D.C. 20550.)

Arctic Research of the United States. (Available: Polar Information, National Science Foundation, Washington, D.C. 20550.)

Prepared by:

Charles Myers
Polar Coordination &
Information

U.S. INSTITUTIONS AND ORGANIZATIONS FUNDED FOR ARCTIC SCIENCE AND ENGINEERING
Fiscal Years 1987 and 1988

Alaska
University of Alaska, Fairbanks
North Slope Borough

Arizona
University of Arizona

California
Aerospace Corporation
California Institute of Technology
Lockheed-Missile & Space, Palo Alto
Polar Research Lab, Inc.
San Jose State University
SRI International
Stanford University
Thermalon Industries, Inc.
University of California, Irvine
University of California, Los Angeles
University of California, Santa Cruz
University of California,
Scripps Institution of Oceanography
University of Southern California
U.S. Naval Postgraduate School

Colorado
University of Colorado, Boulder
University of Denver
National Center for Atmospheric Res.
Ophir Corporation
Olson-Church, Inc.
Colorado State University

District of Columbia
American Geophysical Union
National Academy of Sciences
Smithsonian Institution
Toborg Associates, Inc.
Arctic Research Commission

Florida
University of Miami
Embry-Riddle

Idaho
University of Idaho

Illinois
Carle Foundation Hospital
University of Illinois, Chicago
University of Illinois, Urbana
University of Northern Illinois

Indiana
Purdue University

Iowa
University of Iowa

Maine
University of Maine, Orono

Maryland
Johns Hopkins University
University of Maryland, College Park

Massachusetts
Boston College
Emmanuel College
Marine Biology Laboratory, Woods Hole
Massachusetts Institute of Technology
University of Massachusetts, Amherst
Woods Hole Oceanographic Institution
Harvard University
Cape Cod Research, Inc.

Michigan
University of Michigan, Ann Arbor
Michigan State University

Minnesota
St. Olaf College
University of Minnesota
Augsburg College

Montana
University of Montana

Nebraska
University of Nebraska, Lincoln

New Hampshire
Dartmouth College
University of New Hampshire
U.S. Army Cold Regions Research and
Engineering Laboratory

New Jersey
Rutgers University

New York
City University of New York
Columbia University
Lamont-Doherty Geological
Observatory
Clarkson University
Cornell University
Hunter College
New York City Technical College
Rensselaer Polytechnic Institute
State University of New York, Buffalo
State University of New York, Albany

Ohio
Ohio State University

Oregon
Oregon State University

Pennsylvania
Bryn Mawr
Carnegie Mellon University
Drexel University
University of Pittsburgh

Rhode Island
University of Rhode Island

South Carolina
Clemson University

Tennessee
University of Tennessee, Knoxville
Vanderbilt University

Texas
University of Texas, Austin
Rice University
Southern Methodist University
Simulation Technologies, Inc.
Southwest Research Institute

Utah
Utah State University
University of Utah

Vermont
Center for Northern Studies

Washington
University of Washington
U.S. Geological Survey, Tacoma

Wyoming
University of Wyoming

NATIONAL SCIENCE FOUNDATION ARCTIC AWARDS—FY1987 AND FY1988
(thousands of dollars)

	FY87			FY88		
	DPP	Other		DPP	Other	
Atmospheric sciences						
Tropospheric chemistry/Meteorology	334.9	83.3		205.6	180.0	
Aeronomy	35.0	2579.0		507.1	2583.5	
Solar-terrestrial	469.2	815.6		331.3	1594.2	
Climate dynamics	0.0	0.0		25.0	386.8	
Facilities and equipment	0.0	1655.3		0.0	1730.0	
Subtotal	839.1	5133.2		1069.0	6474.5	
Total		5972.3	(55)		7543.5	(68)
Oceanography						
Physical	707.5	669.0		661.1	685.7	
Chemical	0.0	90.5		40.0	112.9	
Marine ecosystems	1987.6	377.8		1730.8	224.5	
Marine geology	182.4	20.0		16.4	292.3	
Facilities and equipment	0.0	2730.4		0.0	3460.3	
Subtotal	2877.5	3887.7		2448.3	4775.7	
Total		6765.2	(29)		7224.0	(25)
Biological sciences						
Terrestrial—arctic	89.7	869.2		164.0	1044.5	
Terrestrial—other	0.0	1153.8		0.0	544.7	
Freshwater	100.0	100.8		300.0	110.6	
Marine mammals and birds	3.0	0.0		96.0	0.0	
Anthropology	0.0	132.6		72.0	124.2	
Facilities and equipment	60.0	197.5		0.0	231.8	
Subtotal	252.7	2453.9		632.0	2055.8	
Total		2706.6	(22)		2687.8	(20)
Earth sciences						
Quaternary research—eastern Arctic	109.9	73.5		365.1	103.2	
Quaternary research—western Arctic	479.9	0.0		330.1	4.1	
Geology and geophysics—eastern Arctic	176.2	513.8		192.3	251.7	
Geology and geophysics—western Arctic	49.4	451.1		0.0	306.5	
Subtotal	815.4	1038.4		887.5	665.5	
Total		1853.8	(39)		1553.0	(32)

Glaciology					
Greenland		719.0	199.1	516.7	52.0
Alaska		709.3	0.0	429.3	0.0
Other glacier studies		237.5	277.3	366.4	0.0
Glaciology support		669.6	12.5	728.7	29.4
	Subtotal	2335.4	488.9	2041.1	81.4
	Total	2824.3 (27)		2122.5 (25)	
Science and engineering education		43.3	280.2	104.5	246.8
	Total	323.5 (7)		351.3 (9)	
Small business research (SBIR)		0.0	159.5 (4)	0.0	234.5 (3)
Engineering and permafrost					
Engineering		0.0	298.1	130.0	159.8
Permafrost		229.6	0.0	165.0	25.0
Materials		0.0	60.6	0.0	182.3
	Subtotal	229.6	358.7	295.0	367.1
	Total	747.8 (11)		896.6 (13)	
Information and advisory		237.0 (11)	0.0	253.4 (12)	5.0 (1)
Arctic Research Commission		465.0 (1)	0.0	480.0 (2)	0.0
	Subtotal	8095.0	13800.5	8210.8	14906.3
	Grand total	21895.5 (206)		23117.1 (210)	

( ) = Number of Awards

NATIONAL SCIENCE FOUNDATION ARCTIC AWARDS

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Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Atmospheric Sciences					
Tropospheric chemistry and meteorology							
Washington	L.F. Radke	Airborne studies as part of arctic haze	132.8	—	—	—	8519954
Washington	P. Hobbs	Sulfur in the marine atmosphere: a contribution to the Global Tropospheric Chemistry program	—	—	20.0	180.0	8715892
Carnegie Mellon	C.I. Davidson	Processes influencing chemical species concentrations in ice cores from Dye 3, Greenland	87.3	—	89.6	—	8618223
Alaska	G.E. Shaw	Chemical tracers in Alaskan air mass systems: Origin of Arctic haze	—	83.3	—	—	8611438
Alaska	G.E. Shaw	Size distribution of aerosols in polar air masses	41.7	—	46.2	—	8620395
Alaska	K. Jayaweera	Effect of arctic stratus clouds and ice/snow conditions on the radiative heat balance of the Arctic atmosphere and ocean	53.4	—	49.8	—	8618706
Drexel	D.C. Thornton	Interpretation of the sulfur dioxide data from AGASP II	19.7	—	—	—	8619305
Aeronomy							
California	J.G. Luhmann	Radar studies of the auroral zone mesosphere	—	3.4	—	—	8312199
Michigan	J.W. Meriwether	Collaborative optical studies with incoherent scatter radar facilities at Sondrestrom, Greenland	—	133.0	—	148.3	8514647
Michigan	J.W. Meriwether	Ground-based column content measurements of nitrogen oxides, aerosols and ozone in the arctic polar night by lunar absorption spectroscopy	15.0	15.0	2.5	2.5	8614802
Michigan	S.K. Atreya	Collaborative H-alpha and radar measurements of the coupled thermosphere, ionosphere, and exosphere - University of Michigan participation	—	—	—	8.3	8800704
Utah	K.L. Miller	A global study of meridional winds in the thermosphere	—	—	—	59.5	8715367

* Funded by Division of Atmospheric Sciences.

NATIONAL SCIENCE FOUNDATION ARCTIC AWARDS

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Atmospheric Sciences (cont'd)					
Aeronomy (cont'd)							
Emmanuel	S. Basu	Source, evolution, and decay of F-region irregularities at polar and equatorial latitudes	—	—	—	66.0	8715445
Alabama	P.G. Richards	A global study of meridional winds in the thermosphere	—	—	—	30.4	8716036
Alaska	T.J. Hallinan	Auroral imaging program	—	—	—	100.0	8718988
Embry-Riddle	G.G. Sivjee	CEDAR infrared michelson interferometer facility for studies of upper atmospheric chemistry and dynamics	—	—	—	50.8	8720940
Embry-Riddle	G.G. Sivjee	Spectrophotometric studies of metastable atoms and ions in the polar thermosphere	—	—	—	90.0	8696149
Utah	P.J. Espy	NIR airglow investigation of latitudinal and seasonal variations of the chemistry and dynamics of the mesosphere and lower thermosphere	—	—	—	138.7	8801175
Pittsburgh	P.W. Erdman	Ground-based spectroscopic studies of the aurora and dayglow	—	—	—	85.0	8801651
Johns Hopkins	J.P. Doering	Absolute electron impact cross sections for stable and unstable atmospheric species	—	—	—	2.0	8605992
Rice	R.F. Stebbings	Laboratory study of atomic and molecular collision processes of atmospheric importance	—	—	—	120.0	8608792
Cornell	R.N. Sudan	Theoretical studies on ionospheric irregularities in the magnetosphere	—	—	—	105.0	8712710
Harvard	A. Dalgarno	Basic ionization, airglow and auroral processes	—	—	—	118.0	8713204
NOAA/ERL	B. Balsley	A proposal to archive Poker Flat MST radar	—	—	—	23.3	8517141
Pittsburgh	E.C. Zipf	An investigation of the excitation of aeronomically important species by electron impact and dissociative recombination	—	—	—	8.0	8720408

* Funded by Division of Atmospheric Sciences.

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Atmospheric Sciences (cont'd)					
Aeronomy (cont'd)							
Utah State	W.R. Pendleton	Infrared studies of high-latitude upper atmospheric processes	—	7.5	—	—	8411329
Boston College	R.H. Eather	Greenland imaging experiments	—	105.0	—	—	8602218
Alaska	R.W. Smith	Boreal thermospheric dynamics	—	131.4	—	—	8602956
Alaska	R.W. Smith	Collaborative H-alpha and radar measurements of the coupled exosphere, thermosphere, and ionosphere	—	—	—	30.0	8801382
Aerospace Corp.	J.A. Hecht	Fabry-Perot observations of permitted auroral emissions	—	94.9	—	—	8605915
Alaska	M.H. Rees	Research on the Aurora Borealis	—	110.0	—	108.5	8701192
Lockheed	R.M. Robinson	Electrodynamics of auroral and polar cap arcs	—	60.0	—	—	8613357
Lockheed	S.B. Mende	Auroral and ionospheric dynamics in the Polar Cap	—	105.0	—	—	8713214
Pittsburgh	P. Erdman	Line profiles of permitted auroral emissions	—	118.0	—	—	8715574
Pittsburgh	D. Erdman	High resolution spectroscopy of emission excited by electron impact on atmospheric gases	—	—	—	100.0	8800570
Colorado	G.E. Thomas	Polar mesospheric clouds and their atmospheric environment	—	82.0	—	80.0	8714672
Illinois	C. Gardner	Lidar studies of mesosphere structure and dynamics	—	15.0	—	290.0	8811771
Colorado	R. Gladstone	Development of auroral radiative transfer models	—	63.0	—	—	8712027
Colorado	C.G. Fesen	An investigation of thermospheric tides with the NCAR TGCM	—	—	—	29.2	8801067
Cornell	C. Seyler	Theory and simulation of ionospheric irregularities	—	35.0	—	35.0	8619689

* Funded by Division of Atmospheric Sciences.

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Atmospheric Sciences (cont'd)					
Aeronomy (cont'd)							
Stanford	P.M. Banks	Incoherent scatter radar and studies of the Polar Cusp	—	135.0	—	11.3	8503105
Utah	B.G. Fejer	Studies of global electrodynamics and high-latitude irregularities	—	6.5	—	80.3	8616456
Cornell	W.E. Swartz	Magnetospheric and ionospheric research using a portable radar interferometer	—	105.0	—	—	8611809
Alaska	C.S. Deehr	Magnetospheric studies from ground-based circum-polar observations of the Aurora	—	90.0	—	—	8611108
Alaska	C.S. Deehr	Processes in the polar atmosphere near the meso-pause from airglow observations	—	108.4	—	115.0	8814535
Alaska	B.J. Watkins	High-resolution studies of atmospheric turbulence	—	75.0	—	92.0	8713215
Maryland	T.J. Rosenberg	Riometry in Antarctica and conjugate regions	20.0	—	242.6	—	8610061
Stanford	P.M. Banks	Electrodynamic coupling between the solar wind, magnetosphere, and ionosphere	—	7.3(INT)	—	—	8610325
SRI International	O. Beaujardiere	GISMOS workshop	—	50.0	—	—	8615904
Arizona	A.L. Broadfoot	Ground-based optical aeronomy facility	—	150.0	—	—	8610411
California	S. Chakrabarti	Analysis of EUV and visible region airglow and auroral data	—	75.0	—	65.0	8619708
Alaska	D.C. Fritts	CEDAR steering committee	—	9.5	—	—	8619248
Michigan	T.L. Killeen	Theoretical diagnostics using the NCAR thermo-spheric general circulation model	—	104.1	—	109.6	8810085
Utah State	R.W. Schunk	Continuing theoretical studies of dynamical processes in the ionosphere	—	140.0	—	—	8417880

* Funded by Division of Atmospheric Sciences unless otherwise noted.
INT = Division of International Programs

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Atmospheric Sciences (cont'd)					
Aeronomy (cont'd)							
Computational Physics, Inc.	D. Strickland	Analysis of optical data from program CEDAR	—	71.0	—	74.0	8710458
Denver	B. Van Zyl	Laboratory studies for quantitative analysis of the proton aurora	—	119.0	—	—	8518827
Wyoming	J. Rosen	Study of north polar vortex phenomena	—	—	262.0	—	8722171
Solar terrestrial							
New York City Technical College	A. Wolfe	Geomagnetic fluctuations in high-latitude conjugate regions	90.1	—	70.3	—	8618074
New Hampshire	R.L. Arnoldy	Micropulsation research in the Arctic	65.0	55.0	7.9	125.0	8318632
New Hampshire	R.L. Arnoldy	High latitude magnetic studies	—	—	132.8	—	8613272
Stanford	R.A. Helliwell	VLF wave-particle experiments on the magnetosphere and ionosphere from Lake Mistissini, Quebec, and Siple Station, Antarctica	203.4	—	100.0	—	8317092
Stanford	P.M. Banks	Incoherent scatter radar and associated studies of the Polar Cusp	—	9.6	—	135.0	8800327
Alaska	S.I. Akasofu	A study of magnetospheric substorms	—	164.6	—	85.0	8803133
Alaska	S.I. Akasofu	A study of magnetic and auroral records from the seven IMS meridian chains of observatories	—	119.0	—	—	8501718
Alaska	J.R. Kan	A study of solar wind-magnetosphere-ionosphere interactions	—	4.9	—	4.9	8521194
Augsburg College	M. Engebretson	Analysis of ULF pulsation data from ground and satellite magnetometers	—	4.2	—	—	8606388
Alaska	J.V. Olson	A program to investigate the pulsation spectrum at high altitudes and in the Polar Cap	—	85.5	—	—	8416865

* Funded by Division of Atmospheric Sciences.

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Atmospheric Sciences (cont'd)					
Solar terrestrial (cont'd)							
Stanford	U.S. Inan	Geographic distribution of wave-induced burst particle precipitation	—	8.0	—	8.0	8415464
Stanford	U.S. Inan	VLF/LF measurements of ionospheric effects associated with lightning, whistlers and energetic electron precipitation	—	—	—	100.0	8804273
Utah State	J.P. St.Maurice	Study of high-latitude and mid-latitude ionospheric trough using antarctic high-frequency radar data	5.7	—	—	—	8418173
Johns Hopkins	L.J. Zanetti	Studies of auroral Birkeland and ionospheric current	—	135.0	—	—	8507558
Minnesota	R.L. Lysak	Numerical studies of auroral zone dynamics	—	62.5	—	56.1	8451168
Dartmouth	W. Lotko	High-latitude electric fields and plasma turbulence	—	95.0	—	—	8619019
Washington	S.G. Warren	Solar and infrared radiation modeling for the polar regions	15.0	65.0	15.0	65.0	8605134
Washington	K.C. Clark	Balloon-VIKING data analysis	90.0	7.3	5.3	100.0	8710314
Johns Hopkins	C.I. Meng	Aspects of the Earth's magnetospheric dynamics	—	—	—	120.0	8713212
Southwest Research Inst.	C.S. Lin	Study of magnetic pulsations in the magnetosphere	—	—	—	70.0	8713225
SUNY-Albany	J.S. Kim	Continued operation of the auroral zone east-west magnetometer chain and data analysis	—	—	—	25.8	8400789
Alaska	J.V. Olson	Operation of the Alaska-Canada high latitude magnetic chain of stations	—	—	—	68.7	8608985
SRI International	O. Beaujardiere	CEDAR/GISMOS substorm studies	—	—	—	50.0	8800321

* Funded by Division of Atmospheric Sciences.

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Atmospheric Sciences (cont'd)					
Solar Terrestrial (cont'd)							
Aerospace	L.R. Lyons	CEDAR/GISMOS substorm studies	—	—	—	25.0	8800602
Alaska	R. Hunsucker	Multiple incoherent scatter radar, riometer and magnetometer investigations of wave phenomena originating in the high-latitude ionosphere and magnetosphere	—	—	—	41.5	8720541
Lockheed	R.M. Robinson	Electrodynamics of auroral forms at very high latitudes	—	—	—	54.9	8717840
Johns Hopkins	R. Greenwald	High frequency radar studies of the very high latitude ionosphere	—	—	—	125.0	8713982
New Hampshire	R.L. Kaufmann	Active experiments/electric fields	—	—	—	50.0	8802271
Colorado	P.B. Dusenbery	Magnetotail dynamics and auroral wave-particle interactions	—	—	—	70.0	8703301
Rice	T.W. Hill	Solar-wind magnetosphere interactions - theory and data analysis	—	—	—	147.3	8513710
California	G.L. Siscoe	Solar wind-magnetosphere-ionosphere coupling	—	—	—	100.0	8722962
California	R.M. Thorne	Magnetospheric wave-particle processes	—	—	—	92.0	8718108
Facilities, equipment and instrumentation							
SRI International	J.D. Kelly	Sondrestrom incoherent scatter radar facility operation and coordination	—	1590.0	—	1680.0	8516436
NOAA	B.B. Balsley	Operation of the Poker Flat MST radar	—	65.3	—	—	8744561
Alaska	N.B. Brown	Operation of high latitude optical aeronomy observatories in support of CEDAR program	—	—	—	50.0	8718017
Climate Dynamics							
Texas	G.R. North	Theoretical paleoclimate research at Texas A&M	—	—	—	103.3	8715079

* Funded by Division of Atmospheric Sciences.

NATIONAL SCIENCE FOUNDATION ARCTIC AWARDS

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Atmospheric Sciences (cont'd)					
Climate Dynamics (cont'd)							
Columbia	D.A. Robinson	U.S. historical snow data base	—	—	—	81.0	8719865
Columbia	G. Jacoby	Derivation and analysis of climatic information from tree-rings	—	—	25.0	202.5	8716630

* Funded by Division of Atmospheric Sciences

NATIONAL SCIENCE FOUNDATION ARCTIC AWARDS

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Oceanography					
Physical Oceanography							
Illinois	J.E. Walsh	High-latitude North Atlantic boundary sensitivities of monthly dynamical forecasts	65.9	—	69.6	—	8612283
Alaska	T.C. Royer	Alaska coastal current study	—	184.9	—	—	8608125
Alaska	T.C. Royer	Gulf of Alaska recirculation study	—	375.0	—	210.0	8608125
Scripps Institution of Oceanography	P.F. Worcester	Ocean acoustic tomography in the Greenland Sea	261.2	50.0	399.6	100.0	8518643
Washington	K. Aagaard	Dense outflow from the Chukchi Sea: A ventilation mechanism for the Arctic Ocean	92.9	—	—	—	8517372
Washington	D.A. Rothrock	Arctic ice balance: An interpretation of passive microwave and drifting buoy data	76.4	59.1	—	137.9	8617176
Naval Postgraduate School	A.J. Semtner	Interannual variability of arctic sea ice and ocean circulation	46.3	—	—	—	8619669
Scripps Institution of Oceanography	J.H. Swift	Seasonal and interannual variability in the Greenland Sea	106.8	—	100.0	100.0	8714632
Clarkson	H. Shen	Wave-induced sediment enrichment in arctic coastal ice covers	—	—	35.7	—	8721901
Miami	Z. Top	Circulation of the North Pacific Ocean using tritium data	—	—	—	137.8	8510842
Miami	Z. Top	Dissolved gas anomaly as a result of ice formation under winter arctic conditions	58.0	—	56.2	—	8619286
Chemical oceanography							
Miami	H. Ostlund	Arctic Ocean tracer studies	—	—	40.0	—	8800025

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Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Oceanography (cont'd)					
Chemical oceanography (cont'd)							
Woods Hole Oceanography Inst.	H.D. Livingston	Actinide distributions in the Arctic and North Atlantic Ocean	—	90.5	—	112.9	8614545
Marine ecosystems and nutrient cycling							
Alaska	C.P. McRoy	Inner shelf transfer and recycling in the Bering and Chukchi Seas (ISHTAR)	1234.4	—	1236.2	—	8605659
Alaska	V.D. Alexander	Nitrogen dynamics and physical processes in a spring bloom in the seasonal sea ice zone	212.4	—	115.8	140.8	8613769
S. California	C.W. Sullivan	Nitrogen dynamics and physical processes in a spring bloom in the seasonal sea ice zone	—	37.5	—	—	8702074
S. California	J. Grebmeier	Pelagic-benthic coupling at entrophic and oligotrophic sites in the marine environment	—	—	15.0	—	8813046
Alaska	R.C. Highsmith	Amphipod energetics and production in the northern Bering Sea	89.3	89.3	91.7	83.7	8509843
Tennessee at Knoxville	W.O. Smith, Jr.	Phytoplankton/zooplankton responses in Spring in the Fram Strait marginal ice zone	80.0	80.0	—	—	8616325
Columbia	N.R. Swanberg	Radiolaria as indicators of productivity in the Norwegian Sea	141.7	—	—	—	8619216
Purdue	D. Wartzok	Sensory components of under-ice movement and hole finding behavior of ringed seals and Weddell seals	129.1	50.0	—	—	8619272
U of California (Irvine)	G.L. Hunt, Jr.	Effects of hydrographic structure and prey abundance on the distribution of two Bering Sea auklets	56.7	—	—	—	8308232
U of California (Irvine)	G.L. Hunt, Jr.	Effects of colony size on seabird reproductive performance and energetics	—	—	126.0	—	8521178
San Jose State	J. Oliver	Feeding ecology of sea otters in soft-bottom habitats	44.0	—	42.3	—	8619394

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NATIONAL SCIENCE FOUNDATION ARCTIC AWARDS

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Oceanography (cont'd)					
Marine ecosystems and nutrient cycling (cont'd)							
Washington	J. Deming	Benthic bacterial processes: Fate of organic matter in the Greenland Sea	—	—	103.8	—	8800401
Woods Hole Oceanographic Inst.	G. R. Harbison	The biology of gelatinous zooplankton	—	121.0	—	—	8516083
Marine geology							
Woods Hole Oceanographic Inst.	S. Honjo	International workshop on marine geology of the Arctic Shelf and slopes: Dynamics and processes	10.0	—	—	—	8702029
Woods Hole Oceanographic Inst.	G. Jones	Central Arctic Ocean sediments as recorders of high Canadian Arctic climate	—	—	16.4	100.7	8722235
Columbia	J.C. Mutter	Conjugate marine study into deep crustal structure off Norway and East Greenland	32.2	—	—	—	8611825
Columbia	J. Rubenstone	Crustal evolution of a composite oceanic terrane: geochemical and geochronological studies of the Bering Sea	—	20.0	—	—	8615686
Scripps Institution	P.F. Lonsdale	A regional study of the origin of the Hawaiian hotspot trail (Bering Sea leg)	—	—	—	191.6	8710803
U of Colorado	J.T. Andrews	Quaternary paleo-oceanography and marine geology of Northern Hudson Strait and Cumberland Sound: Cryosphere/ocean interactions at the northeastern margin of the Laurentide Ice Sheet	140.2	—	—	—	8619284
Facilities and equipment							
Alaska	E.R. Dieter	Shipboard technician support for the University of Alaska-operated R/V Alpha Helix	—	167.7	—	187.4	8615838
Alaska	E.R. Dieter	Ship operations support for R/V Alpha Helix	—	1104.8	—	1436.2	8615881
Alaska	E.R. Dieter	Shipboard scientific support equipment (Alaska)	—	80.0	—	54.8	8619279
Alaska	T. Royer	Oceanographic instrumentation	—	58.3	—	66.4	8420506
Alaska	D.K. Button	Development of a facility for flow cytometry	—	119.6	—	120.5	8518397

* Funded by Division of Ocean Sciences.

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Oceanography (cont'd)					
Facilities and equipment (cont'd)							
Scripps Institution of Oceanography	C. Harmon	Acquisition of a mass spectrometer for neon and nitrogen isotope studies	—	—	—	10.0	8709056
NSF Division of Ocean Sciences	—	Ship operations support (Endeavor, Thomas Washington, Thompson, Knorr)	—	1200.0	—	1585.0	—

* Funded by Division of Ocean Sciences.

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Biological Sciences					
Terrestrial—arctic							
Woods Hole Marine Biological Lab	G.R. Shaver	Nutrient cycling in an arctic landscape: Interactions between ecosystems along a riverside toposequence	—	270.0	—	—	8507493
Woods Hole Marine Biological Lab	G.R. Shaver	Biogeochemical diversity in the Alaskan landscape: Element transport and the spread of disturbance effects	—	—	—	200.0	8806635
Woods Hole Marine Biological Lab	J.E. Hobbie	A long-term ecological research (LTER) program for the Alaskan Arctic	—	450.0	—	450.0	8702328
Alaska	D.R. Klein	Foraging strategies of the world's northernmost ungulates	9.6	6.1(INT)	—	—	8619964
Alaska	F.S. Chapin	The nature of nutrient limitation in ecosystems	—	—	—	216.6	8705323
Colorado	D.A. Walker	Soil development and plant succession on pingos of the Arctic Coastal Plain	8.0	—	—	—	8520754
Colorado State	D.E. Binkley	Influence of topography on soil acidity and hydrogen ion budgets in an arctic landscape	—	—	—	110.0	8807771
Washington	L.C. Bliss	Development of soil and plant communities in the Arctic	64.1	68.1	72.0	67.9	8520847
Clemson	K.M. Peterson	Plant succession in thaw lake basins and its time scale	8.0	—	—	—	8520730
Illinois	G.O. Batzli	Responses of microtine rodent populations to vegetation in northern Alaska	—	75.0	—	—	8620397
Illinois	R. Nelson	Metabolic and behavioral adaptations for extended fasting in polar bears	—	—	96.0	—	8722053

* Funded by Division of Biotic Systems and Resources unless otherwise noted.
INT = Division of International Programs.

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Biological Sciences (cont'd)					
Terrestrial—other							
Alaska	W.S. Ambruster	Reproductive interactions and plant community organization on south-facing bluffs in interior Alaska	—	8.0	—	—	8516864
Alaska	J.P. Bryant	Plant carbon/nutrient balance in the regulation of large aspen tortrix and spearmarked black moth population outbreaks	—	92.0	—	—	8416461
Alaska	P.B. Reichardt	Role of plant secondary metabolites in Alaskan floodplain succession	—	115.2	—	—	8500160
Alaska	K. Van Cleve	The role of salt-affected soils in primary succession on the Tanana River floodplain of interior Alaska	—	395.3	—	—	8405269
Alaska	K. Van Cleve	Successional processes in taiga forests of interior Alaska: A long-term ecological research (LTER) program for study of controls of subarctic forest development	—	450.0	—	450.0	8702629
Alaska	B. Sveinbjornsson	The relative importance of nitrogen and carbon for tree growth at the subarctic elevational tree line	—	93.3	—	87.9	8706510
Michigan State	J.M. Scriber	Dissertation research: Papilio glaucus in temperate and subarctic forests: Host plant quality and temperature adaptation	—	—	—	6.8	8801184
Freshwater							
Woods Hole Marine Biological Lab	J.E. Hobbie	Response of arctic freshwater ecosystems to environmental stress	100.0	—	300.0	—	8722015
Minnesota	D.R. Engstrom	Early lake ontogeny following neoglacial ice recession at Glacier Bay, Alaska	—	100.8	—	110.6	8705371

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Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Biological Sciences (cont'd)					
Marine mammals and birds							
U of California (Irvine)	G.L. Hunt, Jr.	Effect of colony size on seabird reproductive performance and energetics	3.0	—	—	—	8512278
Carle Foundation	R. A. Nelson	Metabolic and behaviorial adaptations for extended fasting in polar bears	—	—	96.0	—	8722053
Anthropology							
Iowa	E.P. Durrenberger	The anthropology of Iceland (seminar)	—	2.1(INT)	—	—	8705263
Hunter College	T. McGovern	Icelandic paleoeconomy project	—	—	27.5	5.0	8722492
Bryn Mawr	R. Jordan	Nature and development of ranked Eskimo societies	—	68.2	—	—	8616390
Alaska	J.S. Aigner	Archeology and ethnology in the Aleutian Islands, Alaska	—	—	44.5	44.5	8806802
Center for Northern Studies	R. Condon	Aggression management among Inuit adolescents	—	62.3	—	—	8614574
City University of New York	G. Sider	Technological change, gender and class formation in Iceland	—	—	—	5.7	8812878
Alaska	J.J. Enrico	Skidegate Haida lexicon	—	—	—	69.0	8711541
Mississippi State	P. Kwachka	Native American Language Retention (Alaska)	—	—	—	97.4(RII)	8700683
Facilities, equipment and other							
Alaska	D.F. Murray	Facility support for the northern plant documentation center	—	147.5	—	147.5	8706477
Alaska	K. Van Cleve	Acquisition of dual-channel gradient ion chromatograph	—	50.0	—	—	8615543

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RII = Research Initiation and Improvement
INT = Division of International Programs

NATIONAL SCIENCE FOUNDATION ARCTIC AWARDS

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Biological Sciences (cont'd)					
Facilities, equipment and other (cont'd)							
Alaska	F.S. Williamson	Acquisition of equipment and improvement of facilities for research at the Toolik Field Station, Alaska	—	—	—	74.3	8813300
Smithsonian Institution	B.J. Landrum	Recording of data and sorting of collections from polar regions	60.0	—	—	—	7413988
Alaska	W.S. Armbruster	Plant growth facilities for experimental botany	—	—	—	10.0	8802988

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Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Earth Sciences					
Quaternary research—eastern Arctic							
Colorado	J.T. Andrews	Relative sea level changes along the margin of the Hudson Strait/Frobisher Bay ice streams, arctic Canada: a contribution to glacial chronology and glacial isotasy	20.0	39.8	20.0	42.2	8618452
Colorado	J.T. Andrews	Sub-bottom profiler for shallow marine stratigraphic surveys	—	—	4.7	—	8708149
Colorado	G.H. Miller	Holocene glaciation and climate change, western Spitzbergen, Svalbard Archipelago	49.7	—	28.7	38.5	8618452
Colorado	G.H. Miller	Holocene glaciation and climate change, Western Spitsbergen	—	—	63.5	—	8619152
Minnesota	H.E. Wright	Postglacial vegetational and climatic reconstruction for Labrador and adjacent Quebec	—	33.7	—	—	8400638
Woods Hole Oceanography Inst.	S. Lehman	Climate history of West Spitsbergen	—	—	25.9	—	8813875
Woods Hole Oceanography Inst.	G. Jones	Central Arctic Ocean sediments as recorders of arctic climate during the Pleistocene	—	—	100.6	—	8722235
Colorado	S.K. Short	Late Quaternary paleoenvironmental history of northwestern Baffin Island over the last 16,000 years	40.2	—	39.7	—	8619315
Harvard	F. Jenkins	Paleontology and geology of the Triassic-Jurassic boundary in Greenland	—	—	17.4	—	8721757
Columbia	J. Overpeak	Paleoclimatic time series from lake sediments: Baffin Island and North Labrador	—	—	64.6	—	8800749
Columbia	J.P. Grotzinger	Evolution of early proterozoic foreland basin: Bear Creek Foredeep, N.W.T., Canada	—	—	—	22.5	8614670

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Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Earth Sciences (cont'd)					
Quaternary research—western Arctic							
Colorado	S.A. Elias	Insect fossils and late Quaternary environment of southwestern Alaska	47.9	—	—	—	8313620
Oregon	P.J. Bartlein	Vegetational and climatic histories of north-central Alaska during late Quaternary	25.4	—	—	—	8413620
Oregon	N.M. Savage	Paleozoic and early Mesozoic terrane studies in southeastern Alaska	—	—	—	4.1	8602571
SUNY (Buffalo)	P.E. Calkin	Holocene glaciation of southwestern Seward Peninsula, Alaska	72.9	—	—	—	8412897
Alaska	D.M. Hopkins	Correlation and chronology of Late Cenozoic marine transgressions in western Alaska	27.2	—	16.2	—	8620025
Alaska	E. Dixon	Paleoenvironmental analysis of a late-Quaternary cave deposit	—	—	42.1	—	8800011
Colorado	J.T. Andrews	A workshop on the contribution of lake sediments to arctic paleoenvironmental reconstruction	25.3	—	—	—	8701375
Colorado	S.A. Elias	Insect fossils and Late Quaternary environments of southwestern Alaska	47.9	—	—	—	8619310
Massachusetts	J. Brigham-Grette	Correlation and chronology of marine transgressions in western Alaska (collaborative research)	36.0	—	60.1	—	8714671
Ohio State	P.A. Colinvaux	Pollen analysis of three long cores from Arctic Alaska: A test of current concepts in Berington paleoecology	59.8	—	15.4	—	8615507
Washington	P.M. Anderson	Vegetational and climatic histories of central Alaska during the Late Pleistocene	86.0	—	90.0	—	8619214
Washington	L. Brubaker	Late-Quaternary vegetational and climatic history of southwest Alaska	—	—	57.8	—	8722005

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Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Earth Sciences (cont'd)					
Quaternary research—western Arctic (cont'd)							
California	W.A. Clemens	Analysis of a late Cretaceous vertebrate fauna, North Slope, Alaska	51.5	—	48.5	—	8619283
Geology and geophysics—eastern Arctic							
Washington (St. Louis)	S.A. Bowring	U-Pb zircon geochronology and Nd isotopic analysis of the early Proterzoic wopmay, Orogen, N.W.T., Canada	—	71.5	—	63.2	8618612
Washington	F. Ugolini	High arctic soil processes on Svalbard	—	—	12.0	—	8303624
Hopkins	D. DePaor	Structural and textural studies of eurekan deformation on Ellesmere Island, Canadian Arctic	—	64.7	—	—	8618620
Northern Illinois	R. Kalamarides	Oxygen isotope characterization of the Nain anorthosite complex magmas	—	64.0	—	—	8618378
Wyoming	S.B. Smithson	Geophysical studies of oldest Archean crust in West Greenland	41.8	—	9.7	—	8619252
Minnesota	K.L. Kleinspehn	Paleo-stress history and basin evolution: tertiary Central Basin of Spitsbergen	53.9	—	65.0	—	8619050
Columbia	C. Lesher	Chemical interactions between gabbros and their host rocks: Studies of the Tertiary macrodikes of the Kangerdlugssuaq area, East Greenland	—	150.0	—	—	8707536
Massachusetts	S.A. Morse	Contamination of the Kiglapait Intrusion	—	39.0	—	—	8408320
Utah	E.U. Petersen	Physico-chemical characteristics of hydrothermal alteration associated with massive sulfide genesis: Manitouwadge District, Ontario	—	42.7	—	—	8518755
Stanford	D.K. Bird	Reactions and mass transfer in the fluid source region of the Skaergaard magma-hydrothermal system	—	69.8	—	—	8606256
Stanford	D.K. Bird	Geochemical and structural evolution of gabbro-hosted magma-hydrothermal systems: East Greenland	—	—	—	64.0	8803754

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Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Earth Sciences (cont'd)					
Geology and geophysics—eastern Arctic (cont'd)							
Kansas	W. VanSchmus	Geochronology of early Protozeroic Orogenic Belts, southern Churchill Province, Canadian Shield	—	12.1	—	—	8313167
Washington (St. Louis)	R.I. Dymek	Geochemistry and petrology of Archaean supra crystal rocks from West Greenland	48.5	—	90.0	—	8619457
SUNY (Binghamton)	H.R. Naslund	Petrofabric analysis of igneous lamination in layered mafic intrusions	—	—	—	22.0	8804936
Wyoming	J.G. Ogg	A magnetic polarity time scale from the Early Triassic stage stratotypes (Sverdrup Basin, Canadian Arctic)	32.0	—	—	—	8520910
Boise State	C.M. White	Petrogenesis of the Felsic series of the Vanfaldsdalen macrodike	—	—	—	53.0	8804210
Michigan State	K. Fujita	Tectonics and structure of the Laptev Sea Riff	—	—	15.6	—	8721119
Oregon	A.R. McBirney	Apatite and trace elements in the Skaergaard intrusion	—	—	—	49.5	8720465
Geology and geophysics—western Arctic							
California (Santa Cruz)	R.S. Coe	Structural and paleomagnetic investigation around the hinge of southern Alaska	—	44.1	—	—	8609784
Calif Institute of Technology	J. Saleeby	Tectonostratigraphic and geochronological analysis of the Alexander-Taku terrain boundary, southeast Alaska	—	62.9	—	85.0	8605386
Bryn Mawr	M.L. Crawford	Study of metamorphism and deformation in the coast crystalline complex, British Columbia and Alaska	—	4.6	—	—	8407104
Purdue	W.T. Zinmeister	Early Tertiary biogeography of the high Arctic	49.4	—	—	—	8402858
Washington	B.W. Evans	Petrogenesis and structure of the Seward Peninsula coherent blue schist terrane	—	47.3	—	—	8507757

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Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Earth Sciences (cont'd)					
Geology and geophysics—western Arctic (cont'd)							
Alaska	D.B. Stone	Determination of crustal thickness and Pn velocity Yukon Flats and central interior Alaska	—	11.0	—	—	8708591
Rhode Island	T.B. Byrne	Significance of vertical tectonics in convergent margins: Evidence from post accretion strains and uplift rates	—	25.2	—	—	8707993
Arizona	G.E. Gehrels	Geologic U-Pb geochronologic and Nd isotopic analysis of the suture zone separating the Alexandra and Stikine terranes, southeastern Alaska	—	41.9	—	62.2	8616473
Southern Methodist	V. Hansen	Integrated kinematic, geothermobarometric, and isotopic studies of the Yukon-Tanana terrane	—	50.0	—	—	8715911
Vanderbilt	B. Panuska	Paleomagnetic study of the southern Alaska superterrane	—	79.3	—	—	8706547
Columbia	J. Rubenstone	Origin of early Cretaceous near-trench plutons of southern Alaska	—	25.5	—	—	8510065
Columbia	J. Rubenstone	Origin of K-poor peraluminous granitoids in southern Alaska	—	17.5	—	—	870[illegible]90
Columbia	J. Rubenstone	Plutonism, metamorphism and deformation in a Mesozoic active margin: Southeast Alaska	—	—	—	70.8	8721053
Alaska	J. Kienle	Equipment upgrade for the University of Alaska's remote field stations on Mt. St. Augustine Volcano	—	41.8	—	—	705082
Rice	J.S. Oldow	Analysis of fold and thrust belt kinematics in the Central Brooks Range, Alaska	—	—	—	88.5	8720171

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NATIONAL SCIENCE FOUNDATION ARCTIC AWARDS

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Glaciology					
Greenland							
SUNY (Buffalo)	C.C. Langway	The Greenland Ice Sheet Program (GISP) ice core studies	214.4	—	—	—	8520911
Scripps Institution of Oceanography	H. Craig	Methane, helium, and trace gases in polar ice cores	73.3	72.0(ATM)	3.3	—	8218040
Scripps Institution of Oceanography	M.A. Zumberge	A determination of the Newtonian gravitational constant	65.0	85.0(EAR)	36.3	52.0(EAR)	8619186
U.S. Geological Survey (Tacoma)	S.M. Hodge	Studies of internal layering and basal conditions in ice sheets using low-frequency ice radar	32.0	42.1(EAR)	—	—	8518618
U.S. Geological Survey (Tacoma)	S.M. Hodge	Radar studies in the GISP II site-selection area of central Greenland	11.3	—	—	—	8520948
St. Olaf College	R.W. Jacobel	Studies of internal layering and basal conditions in ice sheets using low-frequency ice radar	8.9	—	—	—	8517225
New Hampshire	P.A. Mayewski	A regional study of Greenland snow/ice chemistry	22.1	—	71.4	—	8619158
SUNY (Buffalo)	M. Ram	Insoluble particles in Greenland ice	65.6	—	62.4	—	8619198
Maine	T.J. Hughes	Orthophoto maps for studying ice dynamics on Jakobshavns Glacier	36.0	—	—	—	8400886
Ohio State	J. Bolzan	Glaciology in central Greenland	84.6	—	61.1	—	8520585
Ohio State	E. Mosley-Thompson	Holocene paleoclimatic reconstruction from Greenland ice cores	105.8	—	139.6	—	8520885
California	C. Patterson	Records of natural and industrial lead in Greenland ice	—	—	24.3	—	8718281
Alaska	K. Echelmeyer	Glaciological studies of the Jakobshavns Glacier	62.8	—	118.3	—	8722003

EAR = Division of Earth Sciences.
ATM = Division of Atmospheric Sciences.

NATIONAL SCIENCE FOUNDATION ARCTIC AWARDS

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Glaciology (cont'd)					
Alaska							
California Tech	B. Kamb	Relation between basal water and sliding in a large tidewater glacier	259.5	—	152.7	—	8619352
Colorado	M.F. Meier	Collaborative research: Fluctuations in basal water and sliding of Columbia Glacier, Alaska	114.3	—	68.5	—	8619352
Washington	C.F. Raymond	Basal processes and glacier motion	47.1	—	50.8	—	8520527
Alaska	W.D. Harrison	Basal processes and glacier motion	147.3	—	157.3	—	8519110
Illinois (Chicago)	N.D. Smith	Collaborative research on ice-proximal glacimarine sedimentation processes, Glacier Bay, Alaska	39.6	—	—	—	8420807
Northern Illinois	R.D. Powell	Collaborative research on ice-proximal glacimarine sedimentation processes, Glacier Bay, Alaska	38.7	—	—	—	8619153
Other							
Minnesota	R.L. Hooke	Studies of the interaction between a temperate glacier and its bed, Sweden	23.3	—	25.5	—	8619086
Washington	C.F. Raymond	Mass balance history of Blue Glacier	28.9	—	—	—	8412461
Washington	C.F. Raymond	Glacier surveying	12.8	—	—	—	8619184
Washington	C.F. Raymond	Time scales for advance and retreat of glaciers	—	—	49.0	—	8708381
Washington	E.D. Waddington	Ice flow and microclimate survey at existing core sites at Agassiz Ice Cap, Ellesmere Island, benefits for paleoclimate	26.9	—	37.8	—	8619265
Washington	J. Walder	Debris entrainment processes at glacier beds	—	—	34.7	—	8721159
Ohio State	L.G. Thompson	A cooperative paleoclimatic study of the Dunde Ice Cap and its relationship to global climatic variability, China	105.6	155.7	130.4	—	8519794

* Funded by Division of Atmospheric Sciences.

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Glaciology (cont'd)					
Other (cont'd)							
Miami	E.S. Saltzman	Measurement of dimethylsulfide oxidation products in ice cores: Methanesulfonic acid, dimethylsulfide and dimethylsulfone	40.0	121.6	—	—	8700360
Maine	H. Borns	IPA mobility assignment	—	—	89.0	—	8813520
Glaciological support							
New Hampshire	P.A. Mayewski	Support for the ice core working group (1987-1989)	12.5	12.5	28.2	9.4	8703882
New Hampshire	P.A. Mayewski	U.S. ice core research planning workshop	—	—	7.7	20.0	8813544
Nebraska	K.C. Kuivinen	Logistical support for polar ice core drilling	597.1	—	534.1	—	8318538
SUNY (Buffalo)	C.C. Langway, Jr.	Operation of the central ice core storage facility and information exchange	60.0	—	62.9	—	7508512
Washington	M. Stuiver	Oxygen isotope analysis of ice cores	—	—	80.1	—	8716102
Colorado	J. White	Measurement and interpretation of deuterium excess in polar ice	—	—	10.0	—	8721704
New Hampshire	W. Lyons	Acquisition of state-of-the-art alpha counting equipment	—	—	5.7	—	8708243

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Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
Engineering, Permafrost and Material Properties							
Arctic engineering							
Dartmouth	E.M. Schulson	Industry/University Center for Cold Regions Sciences and Engineering	—	50.0(CDR)	—	—	8507541
Colorado	J.S. Chung	Ice mechanics workshop at Sixth International Offshore Mechanics and Arctic Engineering Conference	—	12.1(MSM)	—	—	8701368
Alaska	W. Sackinger	Port and Ocean Engineering Under Arctic Conditions	—	5.0(MSM)	—	—	8715438
Alaska	W. Weeks	Profile properties of undeformed first-year sea ice	—	—	120.0	—	8721977
Iowa	R. Ettema	Atmospheric and spray icings: Formation and structural loadings	—	75.7(CES)	—	87.9(CES)	8611885
Rennselaer	M.J. O'Rourke	Snow drift loads on multilevel roofs	—	58.5(CES)	—	—	8517076
Idaho	R.L. Sack	Comparison of control experiments with field case studies—testing snow load parameters	—	96.8(CES)	—	—	8512766
Idaho	R.L. Sack	Engineering foundation conference on multidisciplinary approach to snow loading	—	—	—	32.0(CES)	8720272
Alaska	R. Carlson	Development of a strategy for arctic engineering research	—	—	10.0	39.9(CES)	8814352
Permafrost							
Alaska	W.D. Harrison	Heat and mass transport processes in subsea permafrost near Prudhoe Bay West Dock, Alaska	76.1	—	—	—	8312026
Alaska	T.E. Osterkamp	Response of permafrost to surface temperature changes	61.1	—	60.6	—	8721966
Alaska	K. Kawasaki	Investigation of geophysical methods for detecting permafrost, massive ground ice, ice-rich soils and groundwater in permafrost terrain	68.6	—	—	—	8403280

* CDR = Office of Cross-Disciplinary Research
MSM = Mechanics, Structures and Material Engineering
CES = Critical Engineering Systems

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
Engineering, Permafrost and Material Properties (cont'd)							
Permafrost (cont'd)							
Alaska	J.P. Gosink	Career Advancement Award for applying remote sensing to snow, ice, and permafrost research	—	—	59.8	—	8809346
Colorado	M. Meier	Fifth International Conference on Permafrost	—	—	15.0	—	8807466
Miami	G. Brass	Experimental studies of freezing brines	23.8	—	—	—	8415563
Rutgers	F.E. Nelson	Permafrost distribution in irregular terrain	—	—	—	25.0(GRS)	8822676
Rutgers	F.E. Nelson	Cooperative US/USSR research on permafrost mapping	—	—	29.6	—	8721922
Material properties, processes and facilities							
SUNY (Buffalo)	G.C. Lee	Local concrete/steel interface at low temperatures	—	60.6(MSM)	—	—	8501235
Iowa	W.A. Nixon	Material testing machine for the ice research laboratory	—	—	—	80.6(MSM)	8810135
Montana	R.L. Brown	An investigation of thermo-mechanical properties of sea ice	—	—	—	34.6(MSM)	8722904
Clarkson	J.W. Dempsey	Specimen geometry and size effects on the fracture of river and lake ice	—	—	—	67.1(MSM)	8818798
Kentucky	C. Man	Some initial boundary-value problems arising from new constitutive equations for the creep of ice	—	—	—	17.5(DMS)	8703731

* MSM = Mechanics, Structures and Material Engineering
DMS = Division of Materials Science
GRS = Geography and Regional Science

NATIONAL SCIENCE FOUNDATION ARCTIC AWARDS

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
		Science and Engineering Education					
UCIA	A.W. Wong	Research experiences for undergraduates at UCIA Plasma Physics Laboratory HIPAS Observatory (Alaska)	—	40.0	—	—	8712615
Alaska	S. Holloway	Science field school for Alaskan North Slope Borough	—	—	—	33.2	8850094
Alaska	D.W. Swift	Summer intern program for undergraduates	—	40.0(AIM)	—	—	8712048
Alaska	D.W. Swift	Summer intern program for undergraduates	—	—	—	37.1(AIM)	8803442
Alaska	J. Stricks	Improving science education of prospective field-based Alaska native teachers	—	200.2	—	42.7	8652480
Alaska	N.B. Brown	Rural education in Alaska - AAAS Arctic Science Conference	—	—	12.5	12.5	8817540
Alaska	E. Hampton	Action for Access: A model project for Alaska natives	—	—	44.0(GEO)	106.3(SEE)	8850690
New Hampshire	R. Arnoldy	Research experiences for undergraduates	—	—	8.0	—	8804350
Idaho	M. Miller	Research experiences for undergraduates on the Juneau Icefield, Alaska	40.3	—	40.0	—	8712857
American Geophys. Union	A.F. Spilhaus, Jr.	Support for U.S. student participation in the 19th General Assembly of the International Association of Geodesy and Geophysics in Vancouver, Canada	3.0	—	—	—	8517868
Diamond H.S.	S.M. Schoff	Presidential Award for Excellence in Science and Mathematics Teaching	—	5.0(SEE)	—	—	8751559
West Valley H.S.	G.A. Laursen	Presidential Award for Excellence in Science and Mathematics Teaching	—	5.0(SEE)	—	—	8751558

* Funded by Science and Engineering Education unless otherwise noted.
AIM = Division of Atmospheric Sciences.
SEE = Science and Engineering Education
GEO = Geosciences total

NATIONAL SCIENCE FOUNDATION ARCTIC AWARDS

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
Science and Engineering Education (cont'd)							
Kotzebue M.S.	J.A. Walker	Presidential Award for Excellence in Science and Mathematics Teaching	—	—	—	7.5(SEE)	8850756
Clark J.H.S.	L.W. Read	Presidential Award for Excellence in Science and Mathematics Teaching	—	—	—	7.5(SEE)	8850757

* Funded by Science and Engineering Education.

NATIONAL SCIENCE FOUNDATION ARCTIC AWARDS

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
Small Business Innovation Research (SBIR) Program							
Polar Research Laboratory, Inc.	J.O. Anderson	Automatic subsurface profiler for drifting buoys	—	40.0	—	—	8661018
Thermalon Industries, Inc.	S.D. Miller	A lightweight, non-adsorbent, loose-fill thermal insulation for cold climate clothing	—	40.0	—	135.3	8801660
Ophir Corporation	L.D. Nelson	A soil moisture sensor for use in polar regions	—	39.6	—	—	8660562
Simulation Technologies, Inc.	V. Vivatrat	Development of an analysis tool for high and low velocity ice indentation problems	—	39.9	—	—	8660042
Cape Cod Research, Inc.	B. Dixon	Enhanced thermal energy storage in clothing	—	—	—	49.5	8760046
Olson-Church	L.D. Olson	Extent and stiffness of frozen ground using seismic surface waves	—	—	—	49.7	8760712

* Funded by SBIR Program.

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NATIONAL SCIENCE FOUNDATION ARCTIC AWARDS

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
Arctic Information, Commission and Advisory Support							
S. California	J.H. Zumberge	Arctic Research Commission	465.0	—	197.0	—	8509553
Alaska	J. Roederer	Arctic Research Commission	—	—	283.0	—	8813137
National Academy of Sciences	T. Hushen	Polar Research Board	40.0	—	112.1	—	8720279
Colorado (Boulder)	M. Andrews	The Twelfth Northern Libraries Colloquy	46.5	—	—	—	8711944
Alaska	D.M. Hopkins	Symposium and workshop on federal reserved lands in Northwest Alaska	25.0	—	5.0	—	8714963
National Oceanic & Atmos. Admin.	A.D. Hecht	First North American Conference on Preparing for Climate Change: A Cooperative Approach	10.0	—	—	—	8718402
Toborg Associates, Inc.	F. Lazerow	Arctic Five-year Research Plan consultative workshop	5.6	—	—	—	8612039
National Center for Atmos. Res.	J. Eddy	Arctic Interactions Workshop	23.0	—	—	—	8217015
Univ. Corp. for Atmos. Res.	R. Anthes	Support for atmospheric research: Office of Interdisciplinary Earth Studies	—	—	13.0	5.0	8709659
Courtesy Travel Service	L. Lynch	Support for NSF-sponsored Arctic meetings	20.0	—	10.0	—	8618696
Division of Polar Programs		Support of Interagency Arctic Research Policy Committee activities	29.9	—	28.9	—	—
U.S. Army CRREL	S. Bowen	Support for Interagency Arctic Research Policy Committee publications	30.0	—	20.0	—	8703920
Alaska	P. McMillan	Science information transfer: A pilot project for the Arctic	—	—	40.4	—	8815057
North Slope Borough	K. Kolash	Translation services for U.S. Arctic Research Plan	—	—	14.0	—	B34033X

* ARPA funding for FY88 = 230.0; balance distributed in funding to other projects (split-funded)

Institution	Senior investigator	Project title	Funding (thousands) FY87 DPP	FY87 Other*	FY88 DPP	FY88 Other*	Award no.
Arctic Information, Commission and Advisory Support (cont'd)							
V.H. Winston, Inc.	V.H. Winston	Publication of translated journal, Polar Geography and Geology	5.0	—	—	—	8704485
Assoc. of Amer. Geographers	R. Tomlinson	IGU Global Database Planning Project	—	—	5.0	—	8722182
American Geophys. Union	A.F. Spilhaus, Jr.	Report to International Union of Geodesy and Geophysics	2.0	—	—	—	8611830
American Geophys. Union	A.F. Spilhaus, Jr.	Chapman Conference on Gaia Hypothesis	—	—	5.0	—	8715494